

THE additions to the Zoological Society's Gardens during the past week include six Greek Partridges (*Caccabis saxatilis*) from Persia, Naran River, two Black-headed Partridges (*Caccabis melanocephala*), a Hey's Partridge (*Caccabis heyi*) from Hedyar, near Mecca, presented by Mr. F. M. Burke, Commander S.S. *Arctot*; a Yellow-lored Amazon (*Chrysotis xantholora*) from Central America, purchased.

SCIENTIFIC SERIALS

Poggendorff's Annalen der Physik und Chemie, Ergänzung Band viii., Stück 1.—On the electric conductivity of water and some other bad conductors, by M. Kohlrausch.—The mica-combination of Reusch, and the optical rotatory power of crystals, by M. Sohncke.—On determination of the constants for absorption of light in metallic silver, by M. Wernicke.—The interference of refracted light, by M. Lommel.—The fundamental principles of Edlund's electrodynamics, by M. Chwolson.—Volumetric chemical studies, by M. Ostwald.—On the influence of the funnel-valve on electric spark discharges in air, by M. Holtz.—On an electrical fly-wheel like that of the radiometer, by M. Holtz.—Steam-jet air-pump, by M. Teclu.

Journal de Physique, December.—Measurement of the calorific intensity of the solar radiations and of their absorption by the terrestrial atmosphere, by M. Crova.—On various theories given to explain the movements of Crookes's radiometer (second paper), by M. Lippmann.—On the illumination of transparent and opaque bodies (concluded), by M. Lallemand.

THE *Jahrbuch der k.k. geologischen Reichsanstalt zu Wien* (vol. xxvi. part 2), to which are added Dr. Gust. Tschermak's *Mineralogische Mittheilungen* (vol. vi., part 2), contain the following papers:—Geological survey of the Dutch East Indian Archipelago, by Dr. Schneider.—The saline springs of Galicia, by Mich. Kelb.—Report on the volcanic events during the year 1875, by Dr. C. W. C. Fuchs. Of this we publish a detailed account in our "Notes."—On the green slates of Lower Silesia, by Ernst Kalkowsky.—On beryl from Eisvold, in Norway, by M. Websky.—Chemical analysis of the iodiferous saline springs of Darkau, by E. Ludwig.—On the volcanic formations of the Galapagos Islands, by F. A. Geoch.—On a perfect combination of pyrites and hematite crystals, by Dr. C. Hintze.—On some minerals from North-western Silesia, by F. Nenimar.

SOCIETIES AND ACADEMIES

LONDON

Chemical Society, December 18, 1876.—Prof. Abel, F.R.S., president, in the chair.—Prof. W. N. Hartley made a communication entitled "a further study of fluid cavities," in which he described the results of his examination of a large number of topaz and of rock sections, mostly granites and porphyries. The fluid contained in the cavities was almost invariably water, but it was very remarkable that the cavities often took the form of the crystals in which they were contained, and nearly always arranged themselves symmetrically with regard to the faces of the crystal.—A paper by Dr. H. E. Armstrong, F.R.S., on thymoquinone, one on high melting points with special reference to those of metallic salts, part 2, and another on the determination of urea, by Mr. G. Turner, followed this, after which Dr. G. Bischof called attention to the rapid corrosion of the so-called "compo" pipe employed by gas-fitters when used to convey water, especially when exposed alternately to the action of air and water.

Meteorological Society, December 20, 1876.—Mr. H. S. Eaton, M.A., president, in the chair.—Rev. C. C. Chevallier, T. Gordon, and Rev. T. H. Quelch were elected Fellows of the Society.—The following papers were read:—On observations with the psychrometer, by Dr. R. Rubenson (translated from the Swedish, and abridged by Dr. W. Doberck). This paper contains an account of the instructions issued to the Swedish observers in order to obtain trustworthy results from the psychrometer, or dry and wet bulb hygrometer. These instructions, however, do not differ from those followed by English observers at the present time.—Contributions to hygrometry: The wet bulb thermometer, by William Marriott, F.M.S. This paper contains the results of observations made with several wet bulbs in different positions and under different conditions, which were carried on in order to determine what a *wet bulb thermometer should be*. Ten thermometers were used as wet bulbs and three

as dry bulbs. With three wet bulbs the water receptacles were placed at different angles; but it was found that the readings were not affected by the position of the water receptacle. Others were used with different thicknesses of muslin and conducting threads; but it was shown that the thermometers with the thinnest muslins always gave the lowest readings. Three pairs of dry and wet bulbs were used, one with a closed water reservoir six inches from the dry bulb, the other two having open reservoirs which were respectively three inches and one inch from the dry bulbs. It was found that the dry bulbs of the two latter read lower than the former in fine dry weather, but when the air was damp and during rain they generally read higher. The wet bulbs of the latter read a little higher than the former; this was mostly the case in damp weather. In conclusion, the author submitted for adoption certain regulations for the management of the dry and wet bulb thermometers, in order to secure comparable results.—Visibility, by the Hon. Ralph Abercromby, F.M.S. Visibility, or unusual clearness and nearness of distant objects, is a very trustworthy prognostic of rain in this and many other countries. The usual explanation that much moisture increases the transparency of the atmosphere is not borne out by observation. In this country great nearness occurs on a clear, brisk day, when hard masses of cloud shade the glare of the sky from crossing direct light sent from distant objects, and make clearness so great as to give the impression of nearness. The kind of rain which immediately follows nearness is in short sharp showers, but unsettled weather often follows later. The synoptic conditions of nearness in this country are either straight isobars or the edge of anticyclones, neither of which are associated with settled weather.—Description of a meteorographic model, a letter from the late Commodore M. F. Maury, Hon. Mem. M.S., to Capt. H. Toynbee, F.R.A.S.

Physical Society, December 16, 1876.—Prof. G. C. Foster, president, in the chair.—The following candidate was elected a member of the Society:—Mr. W. Baily, M.A.—Mr. Crookes described some of the most recent results he has obtained in his experiments on the radiometer, and exhibited many beautiful forms of the apparatus, most of which have been devised with a view to decide on the correct theory of the instrument. We shall refer to the subject of the paper in an early number.—Prof. Dewar exhibited a simple electrometer which he has designed, founded on the discovery of Leipman that the capillary constant is not really independent of the temperature or condition of the surface, but is a function of the electromotive force. If a capillary tube be immersed in mercury, and dilute sulphuric acid be placed in the tube above the mercury, and a current from a Daniell's cell be so passed through the liquids that the mercury forms the negative pole, the column will be depressed to an extent dependent on the diameter of the tube. In making an electrometer, Prof. Dewar has increased the sensitiveness by connecting two vessels of mercury by means of a horizontal glass tube filled with the metal, except that it contains a bubble of dilute acid. The tube must have an internal diameter of two millimetres, and it is essential that it be perfectly clean, uniform in diameter, and horizontal. The instruments exhibited were constructed by Messrs. Tisley and Spiller, and Prof. Dewar showed that it is possible by means of them to measure an electromotive force equal to $\frac{1}{1000000}$ th of a Daniell's cell; forces capable of decomposing water must be measured by causing two currents to act against each other. The index bubble is brought to zero by uniting the mercury cups by a wire. The apparatus is very convenient, as it requires no preparation and is extremely simple in its action. He then showed an instrument arranged by Mr. Tisley for producing a current by the dropping of mercury from a small orifice into dilute sulphuric acid; if the vessels containing the mercury and the acid be connected by a wire a current is found to traverse it. He then exhibited a manometer suitable for measuring very slight variations of pressure, and he illustrated the use of it for proving Laplace's law that the internal pressure multiplied by the diameter of a soap-bubble is constant. It consists of a U-tube, one arm of which is about 15 inches long, and is bent horizontally and levelled with great care. If the shorter arm be connected with a tube on which a bubble has been blown and the diameter of the bubble be varied, the position of the extremity of the alcohol column will be found to vary in accordance with the above law.

Entomological Society, December 6, 1876.—Sir Sidney Smith Saunders, C.M.G., vice-president, in the chair.—Prof. Eduard Grube, Director of the Zoological Museum of the University of Breslau, and Dr. Katter of Putbus, in the Island of

Rügen, were elected foreign members.—Mr. M'Lachlan (on behalf of Mr. W. Denison Roebuck, of Leeds) exhibited some locusts, a swarm of which had passed over Yorkshire during last autumn. He believed that they belonged to the *Pachytylus cinereascens*, an insect which was supposed to breed in some parts of Northern Europe.—Mr. W. C. Boyd exhibited living larvæ of *Brachycentrus subnubilus* in their quadrilateral cases, having been reared from the eggs. They were of a much larger size than those previously exhibited by him at the meeting of November, 1873, being more than half an inch long.—Mr. S. Stevens (on behalf of Mr. Edwin Birchall) exhibited a specimen of *Cirrhaedia xerampelina*, var. *unicolor*, *Agrotis incertea*, var. *latens*, and what appeared to be a small variety of *Zygena filipendule* with the pupa case and cocoon. They were all taken by Mr. Birchall in the Isle of Man.—Mr. Meldola referred to a request made by Mr. Riley, of St. Louis, Missouri, that entomologists should supply him with cocoons of the parasite *Microgaster glomeratus*, which were much wanted in America to destroy the numerous broods of *Pieris rapæ* which had been imported into that country. Mr. M'Lachlan had at a subsequent meeting stated that *M. glomeratus* was parasitic on *P. brassica*, but doubted whether it ever attacked *P. rapæ*; and Mr. Meldola now exhibited the insects he had found parasitic on these two species, that on *P. rapæ* being *Pteromalus imbutus* (one of the *Chalcididae*), while on *P. brassica* he had observed *Microgaster glomeratus* and a dipterous species *Tachina angusta*. Specimens of all of these were exhibited.—Mr. Smith remarked that he had received a nest of *Osmia muraria*, sent to him from Switzerland, in which he had found in one of the cells a yellow larva, which ultimately proved to be that of a beetle belonging to the *Cleridae* (*Trichodes alvearius*).—Sir Sidney Saunders exhibited a large box of insects of all orders, which had been collected in Corfu by Mr. Whitfield.—Mr. C. O. Waterhouse remarked on the "Catalogus Coleopterorum" of Gemminger and v. Harold, the concluding portion of which was now published. The total number of generic names given is 11,618, of which 7,364 are adopted genera, and 4,254 appear as synonyms. The total number of species recorded is 77,008. Dejean's first Catalogue, published in 1821, gave 6,692 species, while that of 1837 (the 3rd edition) gave 22,399 species, of which, however, only a portion were then described. Taking into consideration the number of species described during the publication of the Munich Catalogue, the number of described species at the present date could not be less than 80,000. Thus, since 1821, the known species of Coleoptera had increased twelvefold.—Sir Sidney Saunders exhibited several larvæ of *Meloidæ* in their first stage, received from M. Jules Lichtenstein, of Montpellier, including (1) the primary larval form of *Sitaris colletes* found on *Colletes succinea*, feeding on ivy blossoms; (2) the same larval stage of *Mylabris melanura* obtained from the egg, and furnished with triple tarsal appendages like other larvæ of *Meloidæ* in their primary form; (3) the exuvie of the primary form of *Meloe cicatricosus* (from the egg), and also the second stage of the same larva, still bearing legs; (4) the primary larva of *Meloe proscarabeus* (?) differing from the foregoing in the structure of the antennæ, taken on an *Andrena*; (5) the corresponding larval stage of *Meloe autumnalis* (?), also differing as aforesaid, taken on *Scolia hirta*.—Mr. C. O. Waterhouse read descriptions of twenty new species of Coleoptera from various localities.

Geologists' Association, December 1.—Mr. William Carruthers, F.R.S., president, in the chair.—On the comparative ages of the English and Scottish coal-fields, illustrated by the geology of the Lothians and Fifeshire, and the structure and age of Arthur's Seat, Andrew Taylor, F.C.S. The author, after alluding to the early interest evoked by the geological problems which a study of Arthur's Seat suggests, proposed to bring forward some local sections bearing on the question of its age. A section, beginning with the Burdiehouse limestone quarries at East Calder, deals with upwards of 1,700 feet of strata. This area had undergone much disturbance; the trap-sheets were shown to fill the crevices, consequent on the subsidence, both in the main lines of shrinkage and in the parallel ones; nor does this shrinkage and contemporaneous emission of volcanic matter terminate in the lower strata. The structure of the Torbane hill mineral basin proves this. Another section was described at North Queensferry, through what was originally supposed to have been a compact mass of intrusive dolerite. During the earlier operations no igneous rock was touched; it was only towards the close of the work that the narrow plug became visible. The superposition of the beds cut through is—3. Sandstone, 2. Shale, 1. Freshwater (Burdiehouse) lime-

stone. The freshwater limestone was found only in the plug of the tunnel, standing almost vertically, and having a white crystalline character. Below it occurred a bed of ozokerite, three inches thick. The shale near the plug lost its fissile laminated character, assuming a somewhat columnar form. Whilst the dolerite on the hill is visibly crystalline, at the plug it presents a compact aphanitic mass. We have here, as elsewhere, the association of ozokerite and bitumen with limestone.

PARIS

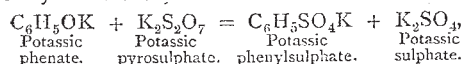
Academy of Sciences, December 18, 1876.—Vice-Admiral Paris in the chair. The following papers were read:—Note on the integration of total differential equations, by M. Bertrand.—Theorems concerning couples of segments taken the one on one tangent of a curve, and the other on an oblique of another curve, and making together a constant length, the curves being of any order and class, by M. Chasles.—On the secular displacements of the plane of the orbit of the eighth satellite of Saturn (Japhet), by M. Tisserand. If we consider on the sphere great circles representing the orbit of Saturn and his ring, and draw through their intersection two great circles suitably chosen, the orbit of the satellite will form with these two latter circles a triangle of constant surface.—Microscopic study of the volcanic rocks of Nossi-Bé, by M. Velain.—Method of methodic compression and immobilisation, by M. Chassagny. A solid inextensible envelope with a caoutchouc bag under it incloses the region to be compressed (e.g. a limb), and the bag is injected with air or water.—On a particular class of left uniserial curves of the fourth order, by M. Appel.—Manometer for measuring high pressures, by M. Cailletet (already noticed in connection with the *Journal de Physique*).—Researches on mannite with regard to its optical properties, by MM. Müntz and Aubin. Mannite, of whatever origin, presents the same optical properties.—On the keel of least resistance, by M. Bélégue.—Various notes on Phylloxera.—Calculation of three observations of the new star of Cygnus, by M. Schmidt.—Preliminary note on photographs of stellar spectra, by Dr. Huggins. He submitted a copy of the photographed spectrum of Vega (α Lyræ), in which are seven broad lines, two of them coinciding with the two lines of hydrogen in the solar spectrum.—Observations on the explanation of the phenomenon of the black drop at the moment of exterior contact of Venus and the sun, by M. van de Sande Backhuysen.—Second note on the theory of the radiometer, by Mr. Crookes.—On an arrangement for reproducing Foucault's experiment (stoppage of a turning disc under the action of an electro-magnet), with the aid of the syren, by M. Bourbouze. The copper disc is fixed on the axis of the syren, and when the magnet is made the sound suddenly stops.—Practical method of testing an element of a battery, by M. Leclanché. He states some interesting effects of variation of temperature on a Daniell element.—Note on the presence of sugar in the leaves of bræts, by M. Corenwinder.—Note on a rapid means of determination of lime in presence of magnesia, and on the application of magnesia to the defecation of saccharine juices, by MM. Bernard and Ehrmann.—On the fall of cold air which produced the disastrous frost in the middle of April, 1876, by M. Barral. This he considers strongly in favour of M. Faye's theory.—Absorption, by a meadow, of the fertilising principles contained in a liquid charged with manure and employed in watering, by M. Leplay.—On the quantity of rain that fell and was collected during the heaviest showers, from 1860 to 1876, by M. Berigny. The average of water which fell in ten to forty-five minutes, in the heaviest showers, was 0.51 mm. per minute, which would give 1.53 cc. for thirty minutes (an exceptional case occurred on August 2, 1866, when a shower furnished, in ten minutes, 11.62 mm. of water, equivalent to 1.16 mm. per minute).—Relations between the optical elements of Arthropoda and those of certain worms, by M. Chatin.—On the beds of fossil bones of Pargny Filain and of Dezanne.—M. Decharme described an experiment with coloured rings. Directing a current of vapour of bromine, iodine, or sulphhydrate of ammonia against a metallic plate, he obtains, by chemical process, coloured rings similar to the thermal rings he got with a jet of flame.

BERLIN

German Chemical Society, November 13, 1876.—A. W. Hofmann, president, in the chair.—O. Pettersson has determined the atomic volumes of isomorphous mixtures of selenates and sulphates, notably of the alums, containing both acids.—A. Horst-

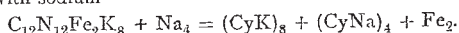
mann published researches on the tension of dissociation, proving that the presence of one of the constituents of a substance liable to dissociation diminishes this tension.—V. Meyer described a simple apparatus to show the increase in weight by the combustion of a candle.—Friedrich Müller described simple apparatus for the lecture-room to determine the density of gases and the quantity of water formed by the combustion of hydrogen. The same chemist has determined the temperatures to which solutions of different salts are raised by a current of steam.—C. Hensgen has treated the sulphates of potassium, sodium, and lithium with hydrochloric acid gas at high temperatures, transforming them into chlorides. Sulphate of copper absorbs under similar circumstances 2HCl; heated in a current of air, this (molecular?) compound yields chlorine and water, and reproduces sulphate of copper. These experiments are interesting with regard to Deacon's process.—H. Iobst has found in coto-bark a new base, called by him para-cotoin.—C. Böttinger has treated racemic acid, $C_3H_4O_4$ with hydrocyanic and hydrochloric acids, transforming it into lactic acid as well as into a new acid of the formula $C_7H_{10}O_7$, or $C_7H_8O_7$.—C. Vogel showed absorption-bands produced by magnesium and alumina in solutions of purpurine; by their means traces of these substances can be recognised in the presence of large quantities of organic substances, as in milk, urine, tartaric acid, &c.—C. A. Martius reported on the Chemical Exhibition at Philadelphia.

November 27, 1876.—A. W. Hofmann, president, in the chair.—E. Baumann described phenylsulphate of potassium, obtained by the reaction



a well-defined crystalline salt easily decomposed into phenol and sulphuric acid. Conjointly with E. Herter Mr. Baumann proved the transformation of phenoles into phenolsulphates by the digestion in warm-blooded animals.—A. Atterburg described chlorides obtained from α and β dinitronaphthalenes, and expounded the probable reasons of their isomerism.—W. Thörner reported on some derivatives of phenyl-toluy-ketone.—T. Hunats described citrate of methyl $C_3H_7(OH)(CO_2CH_3)_3$, acetyl-citrate of methyl $C_3H_7(OC_2H_5O)(CO_2CH_3)_3$, the product of the action of PCl_5 on the former, viz., $C_3H_7Cl(CO_2CH_3)_3$, monochloro-tricarballate of methyl; and experiments trying in vain to produce ethyl-citrate of ethyl.—H. Willgerodt stated that α -dinitrochlorobenzol yields with acetamide (and alcohol) ortho-para-nitraniline (and acetic ether). With urea it yields another dinitraniline.—L. F. Nilson described double nitrites of platinum with K, Na, Li, Rb, Ag, Ca, Sr, Ba, Pb, Mg, Mn, Co, Ni, Fe, Zn, Hg, Be, Al, Cr, In, Y, Er, Ce, La, and Di.—C. Liebermann proved frangic acid to be identical with emodin $C_{14}H_8O_4 + 1\frac{1}{2}H_2O$. The same chemist showed glass tubes profoundly attacked and rendered non-transparent by water at 200°.—A. Michael and Th. Norton, by treating resorcin with terchloride of iodine, have obtained teriodo-resorcin.

December 11, 1876.—A. W. Hofmann, president, in the chair.—E. Berglund, who obtained inido-sulphonate of ammonium, $NH(SO_2ONH_2)_2$, by treating chlorosulphuric acid, $ClSO_2OH$, with ammonia, has found that by boiling the same with baryta, it yields the barium salt of amido-sulphonic acid, NH_2SO_2OH .—S. Stein described flasks, thermometers, and circular measures of rock crystal.—W. Thörner described an apparatus for distilling in vacuo, permitting the change of the receiver without taking the apparatus to pieces.—H. Landolt published interesting details of a projecting apparatus used by him for lecture-purposes.—F. v. Lepel communicated his observations on spectroscopic reactions of magnesium salts.—E. Glatzel described titanic sulphates derived from TiO_2 and Ti_2O_3 .—E. Erlenmeyer has observed that an acid phosphate of lime, $CaH_4(PO_4)_2H_2O$, when treated with less water than is necessary for its solution, is decomposed into insoluble dicalcium phosphate, $CaHPO_4 + (H_2O)_2$, and free phosphoric acid. The same chemist recommends the following easy method for preparing cyanides, viz., to fuse ferrocyanide of potassium with sodium—



The same chemist, by oxidising normal oxycaproic acid, $C_6H_{12}O_3$, obtained normal valerianic acid.—E. Fischer has transformed diphenylamine into diphenyl-nitrosamine, and the latter into $(C_6H_5)_2N-NH_2$, diphenyl-hydrazine, isomeric with hydrazobenzol, but not transformable into benzidine.—C. Böttinger confirmed former observations that citraconic acid and its

isomers treated with nascent hydrogen yield the same pyruvic acid.—A. Laubenheimer reported on orthodinitrochlorobenzol; one of the NO_2 groups having been replaced by NH_2 , it yielded, by treatment with nitrite of ethyl, paranitrochlorobenzol.—H. Limpicht published detailed researches on various bromobenzolsulphonic acids.—G. Krämer to purify methylic alcohol transforms it into formate. The impurity found in the pure alcohol of commerce is dimethyl-acetal. Conjointly with Grotzky he has found in impure methylic alcohol: acetone, dimethyl acetal, allylic alcohol, methyl-ethyl-ketone, higher ketones and oils which with chloride of zinc yielded cymol and xylol.—H. Bulk published simple contrivances to replace the ordinary suction-pump and separating funnel.—C. Liebermann and O. Burg have made researches on braziline, to which they give the formula $C_{18}H_{14}O_5 + H_2O$; the formula of haematoxylene being $C_{16}H_{14}O_6$. Braziline, when oxidised, yields the colouring matter brasileine, $C_{16}H_{12}O_5$.—A. Frank gave a warning against the use of glass for sealed tubes, that yield more than 1 per cent. of soluble matter to water. He also mentioned that wine bottles are now in use that yield alkali to the wine, thereby spoiling their taste.

VIENNA

I. R. Geological Institution, November 26, 1876.—The Director, M. F. v. Hauer, referred briefly to M. F. Fötterle, vice-director of the institution, who died last summer; he then welcomed M. R. Drasche, who has recently returned from his travels in the Philippine Islands, Japan, and North America. The following papers were read:—Dr. Stache on the old eruptive rocks from the region of the Ortler Mountains; these bear a strong resemblance to modern andesites, and he showed their distribution on a large-scale map. The name of Ortlerite was proposed for one sort of these rocks, with a dioritic dark-coloured cement, a more basic nature, and of an older geological period; for the newer one, with a light-coloured trachytic and more acidic cement, the name of Guldenite was adopted. Many specimens which he presented contain various enclosures of other crystalline rocks.—Dr. E. Majsiowics presented the detailed geological map of South-Eastern Tyrol and the province of Belluno. The mapping was performed in the years 1874–1876, under the direction of the reporter, assisted by Dr. Hörnes and Dr. Dölter, since appointed professors at the University of Graz.—Dr. Tieze, on the country of Krasnowodsk, on the eastern coast of the Caspian Sea, which he had visited on his return from Persia. He stated that the supposition of a reappearance of the Persian-Armenian salt-beds in these parts, was erroneous. The large gypsum beds in Kubadagh belong to the mesozoic formations, and might be contemporaneous with the Jurassic gypsum-beds of Daghestan. The hills of Krasnowodsk may be regarded as a continuation of the Caucasian Mountains, and form the northern part of an anticlinal, whose southern part is partly formed by the Turcomanic Balkan.—Dr. Koch, on the occurrence of ice-crystals in loose gravel which he had observed at the Arlberg.—Dr. Drasche mentioned a similar occurrence that he had noticed during his travels in high mountainous regions of the tropical zone.

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